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Deconstructing mutation in Breton

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Workshop of the Representation and Selection of Exponents
8th June, 2012
University of Tromsø/CASTL



Plan

- ▶ What is “mutation”, and who’s in charge?
- ▶ Assumptions
 - ▶ Substance-free representations
 - ▶ Stratal computation
- ▶ Mutation in Breton
- ▶ It’s all phonological, but...
 - ▶ Coalescence vs. floating features
 - ▶ Stratal differences
 - ▶ Triggering differences
- ▶ Overall, Breton mutation is not very problematic for phonological theory
- ▶ But we need to understand the triggering better



On “mutation” What is mutation?

Consonant mutation

One definition

[T]he term “consonant mutation” refers to a class of processes by which a consonant turns into a segment with a different degree of voicing, continuancy, or nasality that is not due to neutralization or assimilation to a neighboring segment of the same natural class.

(Grijzenhout 2011)

▶ An example: Fula

- | | | | | |
|-----|----|------|-------------|---------------|
| (1) | a. | (i) | [pullo] | ‘Fula person’ |
| | | (ii) | [fulbe] | ‘Fula people’ |
| | b. | (i) | [o warii] | ‘(s)he came’ |
| | | (ii) | [be mbarii] | ‘they came’ |



On “mutation” What is mutation?

Analytical challenges

- ▶ What is the rationale, i. e. how do we describe the pattern phonologically?
- ▶ What is the mechanism: is it a piece of phonology, is there morphology involved? Anything else?
- ▶ What is the trigger: where do the mutation mechanisms come from?
 - ▶ Is it just regular phonology?
 - ▶ Is it phonological bits and pieces that happen to come from the lexicon?
 - ▶ Is it phonological bits and pieces that are the exponents of some morphology?
 - ▶ Is it just some totally random, subcategorization-driven insertion, i. e. the debris of history (à la Yu 2007)? Although it still has to be inserted in response to *something*...



Celtic mutations

- ▶ Sometimes seen as a “prototypical” type of mutation
- ▶ Huge literature: here’s just a selection (only the phonological literature)
- ▶ Hamp (1951); Ellis (1965); Albrow (1966); Rogers (1972); Ó Dochartaigh (1978); Ewen (1982); Lieber (1983, 1987); Ball & Müller (1992); Swingle (1993); Grijzenhout (1995); Hannahs (1996, 2011); Kibre (1997); Pyatt (1997, 2003); Wolf (2005, 2007); Green (2006, 2007); Cyran (2010)
- ▶ The phonology can be tricky
 - ▶ Chain shifts (e. g. Irish [p] → [f], [f] → ∅)
 - ▶ Funky changes (Irish [dʲ] → [j] even as [bʲ] → [vʲ])
 - ▶ Unnatural classes (Welsh [m] → [v] but not [n] → [ð])



Triggering

- ▶ Random lexical items
- ▶ Lexical items only under certain morphosyntactic conditions (e. g. definite article only if feminine singular — most Celtic languages)
- ▶ Certain morphosyntactic and/or linear conditions:
 - ▶ Welsh: adjectives mutate if governed by a FEM SG noun — but only in NA order
 - ▶ ...although gender/number agreement still persists in AN constructions
 - ▶ Welsh: the XP-trigger hypothesis (Borsley & Tallerman 1996; Tallerman 2006; Borsley et al. 2007): “An XP mutates if it is c-commanded by the preceding adjacent XP”



Previous treatments

- ▶ Once we abandoned arbitrarily triggered rules, the standard approach has been autosegmental
- ▶ Starting with Lieber (1983), also Swingle (1993); Wolf (2005, 2007)
- ▶ Problems: hard to get in (parallel) OT because of the high heterogeneity of changes
- ✂ Hard to express with SPE features, contrast Ó Dochartaigh (1978); Ewen (1982); Grijzenhout (1995); Cyran (2010)
- ▶ Spirited defence by Wolf (2005, 2007) relies on somewhat suspect constraints
- ✂ MAXFLOAT: not really explanatory, only works in concert with *FLOAT
- ✂ No VACUOUS DOCKING: tricky to formalize
- ✂ No TAUTOMORPHIC DOCKING: decidedly non-modular



Abandoning phonology I

- ▶ Problems with triggers
- ▶ Random lexical items: OK, the autosegment is just part of the random item
- ▶ Lexical items + morphosyntax: ambiguous
 - ▶ Homophony *modulo* the floating material: a bit inelegant
 - ▶ Mutation spells out the grammatical features (e. g. FEM SG DEF): hasn’t really been tried to my knowledge
- ▶ Pure syntax (like the XP trigger): utterly mysterious
 - ▶ Just insert an autosegment in this syntactic configuration (Lieber 1987; Borsley & Tallerman 1996)
 - ▶ Exception: Roberts (2005) tries to express the Welsh facts with Case
 - ▶ Tallerman (2006); Borsley et al. (2007) argue against the syntax



Abandoning phonology II

- ▶ Green (2006, 2007): mutation is like Case, a feature that words agree for
- ▶ The phonological rationale is arbitrary and a fact of lexical insertion
- ▶ Similar approaches: Stewart (2004); Iosad (2008), also Kaye & Pöchtrager (this workshop)
- ▶ But is “mutation” a thing?



Substance-free phonology

- ▶ Morén (2006, 2007); Blaho (2008); Youssef (2010); Iosad (in preparation)
- ▶ Phonology is an autonomous module of grammar
- ▶ No universal phonology-phonetics mapping
- ▶ No universal feature set (a bit like Mielke 2007)
- ▶ No functional considerations in computation
- ▶ Phonological representations are determined based on the patterns in each language at hand



Stratal OT

- ▶ Computation proceeds in three steps
 - ▶ Stem-level (at least root-to-stem, stem-to-stem derivation)
 - ▶ Word-level (stem-to-word)
 - ▶ Postlexical (word concatenation)
- ▶ Potential reranking across the strata
- ▶ “Bracket erasure”: only the output of the previous stratum is visible to each computation



Bothoa Breton mutations

- ▶ Breton dialect of Bothoa
- ▶ Description by Humphreys (1995)
- ▶ Somewhat atypical prosodic system
- ▶ But the mutation system is largely in line with what you find across Breton dialects
- ▶ With one exception that we come back to later



Bothoa Breton consonants

See the appendix for the featural structures I propose

Manner	Labial	Coronal	Postalveolar	Palatal-labial	Palatal	Dorsal	Glottal
Stops	p b	t d				k g	
Affricates			tʃ dʒ				
Fricatives	f v	s z	ʃ ʒ				h
Nasals	m	n			ɲ		
Laterals		l					
Rhotics		r					
Approximants	w			ɥ	j		



Mutations: lenition

Process	Voicing				Spirantization			Deletion	No change										
Unmutated	p	t	tʃ	k	hr	b	m	g	gw dʒɥ	d	dʒ	f	v	s	z	ʃ	ʒ	h	n
Lenited	b	d	dʒ	g	r	v	v	h	w v	d	dʒ	f	v	s	z	ʃ	ʒ	h	n

- Note the heterogeneity of the processes
- Chain shift alert: [p] → [b] → [v]



Mutations: spirantization

Process	Voicing		Fission	Spirantization					
Unmutated	p	t	tʃ{ɛ ø a}	k	tʃ{i y}	tʃɥ	kl	kr	kw
Spirantized, phonological	v	z	hj	h	h	hɥ	hl	hr	hw
Spirantized, phonetic	[v]	[z]	[ç]	[h]	[h]	[ɥ]	[l]	[r]	[w]

- Note that the behaviour of [tʃ] is different depending on the following vowel
- Note spirantization-and-voicing of [p t] but not [b d]



Mutations: provection

	Devoicing									Prefixation of [h]					
Unmutated	b	d	dʒ	dʒɥ	g	gw	v	z	ʒ	V	j	w	l	m	n
Proected, phonetic	[p]	[t]	[tʃ]	[tʃɥ]	[k]	[kw]	[f]	[s]	[ʃ]	[hV]	[ç]	[w]	[l]	[ɹm]	[ɹn]
Proected, phonological	p	t	tʃ	tʃɥ	k	kw	f	s	ʃ	hV	hj	hw	hl	hm	hn

- Basically, you devoice obstruents and prefix [h] to sonorants and vowels



Provection

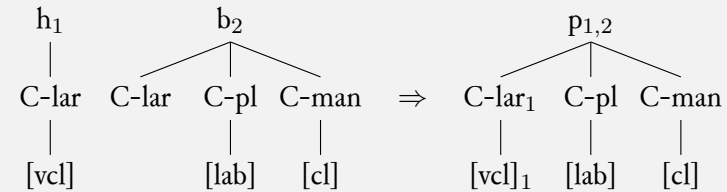
- (2) a. (i) ['ma:b] son
 (ii) [o 'm̥ma:b] your (pl.) son
 (iii) [o 'hma:b]
 b. (i) ['alve] key
 (ii) [o 'halve] your (pl.) key
 c. (i) ['brø:r] brother
 (ii) [o 'prø:r] your (pl.) brother

- ▶ Best treated simply as coalescence with [h]
- ▶ If the clitic is /oh/, we only have to ensure coalescence
- ▶ This is **simply phonology**
- ▶ Prediction: provection is not morphologically constrained in interesting ways

Correct



Provection: the autosegmental analysis



- ▶ Violated constraints: MAX(C-lar), DEPLINK(Rt, C-lar), DEPLINK(Rt, [vcl])
- ▶ Highly ranked constraints: whatever causes the coalescence, MAXLINK(Rt, [vcl])
- ▶ So far, so good



Spirantization: the explananda

- ▶ There are actually two types of spirantization
 - ▶ One affects only [k] and [tʃ], morphologically restricted
 - ▶ Another one gives the full package, associated with random lexical items
- ▶ Why the morphological restriction?
- ▶ Why the different behaviour of [tʃ] before [i y] contra [ɛ ø a]?
- ▶ Stratal OT to the rescue!



Detour: stratal aspects of palatalization I

- ▶ Unlike other Breton dialects, Bothoa shows a process of palatalization
- ▶ /k g/ → [tʃ dʒ] / _ i, y
- ▶ This is exactly where we get [h] and not [hʲ] as the spirantization of [tʃ]

- (3) a. ['tʃi:] 'dog'
 b. [ə hi:] 'a dog'
 c. *[ə ʃi:]

- ▶ Makes sense that 'dog' is /ki/ (so in other dialects, too)



Detour: stratal aspects of palatalization II

- Crucially: palatalization is only active at the **stem** level
 - No tautomorphic [ki gi ky gy] (with one exception — it's OK, stem-level rules have exceptions; Bermúdez-Otero forthcoming)
 - No palatalization before word-level suffixes:

- (4) a. ['burkiʒ] 'village population'
 b. ['ple:giɖ] 'you (pl.) will fold'

- No palatalization where [i] is derived

- (5) a. ['klɔ:ge] 'ladle'
 b. ['klɔ:giad] 'ladleful'



What about [hj]?

- (6) a. ['tʃɛzəŋ] 'horses'
 b. [mə'hjɛzəŋ] 'my horses'

- Proposed analysis:

- Underlyingly, 'horses' is /kɛzəŋ/
- At the stem level, it is parsed as [kɛzəŋ] to avoid hiatus
- Palatalization fails to apply because it is only allowed by **nuclear** [i]: *[tʃɛzəŋ]
- And coalescence is disallowed at the stem level
- At the word level, both [k] and [tʃ] become [h]
- Word-level mutation-triggered mappings
 - /tʃi:/ → ['hi:]
 - /kɛzəŋ/ → ['hjɛzəŋ]
 - Just as [kri:b] 'comb' becomes [mə'hri:b] 'my comb'



Stratal aspects cont'd

- What about unmutated 'horses'?
- It comes out of the stem level as [kɛzəŋ]
- At the word level, /kj/ should be allowed to coalesce to [tʃ]

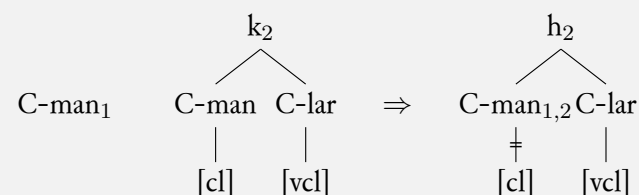
- Correct

- (7) a. [ˌlas'tikən] 'rubber band'
 b. [ˌlastitʃəw] 'rubber bands'

- Plenty of other evidence for coalescence at the word level with non-dorsals



Spirantization: the phonology



- It looks like subtraction, but I suggest it is additive
- MAX(C-man) forces coalescence
- But DEPLINK(C-man, [cl]) outranks MAX([cl])
- There is a link between the surface correspondents of C-man₁ and [cl]₂, which gives the violation
- No need for MAXFLOAT



Spirantization: the morphology

- ▶ Restricted spirantization: only [k] and [tʃ] are affected, although floating C-man could do similar damage elsewhere (indeed we shall see it does)
- ▶ The floating C-man **has** to come in at the word level, because the distinction between [ki] and [kiV] is erased in its output
- ▶ Floating C-man is a **word-level** morphological element which **subcategorizes** (Paster 2006; Bye 2007; Yu 2007) just for [k tʃ] at the point of lexical insertion
- ▶ We expect the mutation to be morphologically restricted
- 🔊 Correct: “the definite and indefinite articles cause restricted spirantization only for [MASC SG], [MASC PL —ANIM], [FEM PL]”
- ▶ This looks like agreement that kicks in when DEFINITE has a value



Full spirantization: the morphology

- ▶ Triggered by possessive clitics
- ▶ Rather similar process, but:
 - ▶ Adds voicing (also subtractive) to the mix for [p t] ⇒ floating C-man *and* C-lar
 - ▶ No spirantization of [b d] ⇒ no floating features at all
 - ▶ [hr] → [r] seems kind of unrelated
- ▶ Massive subcategorization at point of insertion
- ▶ Also keeps the [h]/[hj] contrast
- 🔊 Should also be morphological and word-level
- ▶ Proposal: agreement morphemes in the presence of a possessor
- ▶ Corroboration: some dialects lose full spirantization (possessor agreement) even as restricted spirantization (definiteness agreement) remains extremely vital



Lenition: the phonology

- ▶ Voiceless stops become voiced: [p t tʃ k] → [b d dʒ g]
- 🔊 Floating C-lar, with a DEPLINK solution
- ▶ Voiced stops spirantize (chain shift): [b g] → [v h]
- 🔊 Floating C-man
- ▶ But [d] and [dʒ] are unaffected
- ▶ Although [m] and [ŋ] are not: [m ŋ] → [v r]



Lenition: stratal aspects

- ▶ Lenition must be postlexical
- ▶ Reason: there is a “failure of lenition” following obstruents

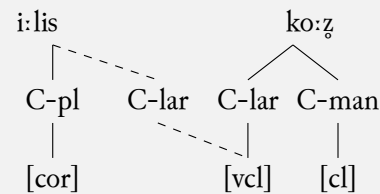
(8) Lenition

- | | | |
|----|--------------------|-----------------|
| a. | [ˈkoːz] | ‘old’ |
| b. | [oːˈgaːdər ˈgoːz] | ‘an old chair’ |
| c. | [on ˌiːlɪs ˈkoːz] | ‘an old church’ |
| d. | *[on ˌiːlɪz ˈgoːz] | |

- ▶ To make a long story short...
- ▶ The floating C-lar docks to a preceding consonant instead of the following one, creating a domain for [vcl] spreading



Failure of lenition: the autosegmental analysis



- Crucially, the process can only apply when there is word concatenation, i. e. it is postlexical



Stratal aspects of lenition I

- The behaviour of [dʒ] corroborates this stratal insight
- In principle, [dʒ] can be underlying or derived from [g] via palatalization
- In lenition, [dʒ] → [dʒ] but [g] → [h]
- We could expect that different types of [dʒ] could behave differently in lenition
- For instance, [dʒ] → [h] before [i y]



Stratal aspects of lenition II

- (9) Potential underlying /gi:r/ for [dʒi:r] ‘word’ (Welsh *gair*)
- [dʒi:r] ‘word’
 - [i dʒi:r] ‘his word’
 - *[i hi:r]

- Or [dʒ] → [hj]
- These patterns are **unattested**
- Mysterious under a standard approach
- Explained in stratal terms: the distinction between /dʒ/ and potential /gi/ is obliterated by lower levels, so when lenition comes in postlexically, it does not have access to that information
- Further support for postlexical affiliation: Pyatt (2003) — lenition sensitive to prosodic structure



Unanswered questions

- Lenition is postlexical, so it is difficult to ascribe it to some morphology
- But it does seem to involve subcategorization, like the morphological process of spirantization
- So where in the syntax do the floating bits of phonology come from?
 - Random lexical items: this would require multiple trigger allomorphs differing only in the mutation-causing material
 - Some morphosyntactic conditioning: some solution à la spirantization may be possible
- Similar conundrum to the Welsh “direct object mutation”



Conclusion

- ▶ Mutations in Bothoa Breton are mostly amenable to straight phonological analyses
- ▶ Although some subcategorization appears inevitable
- ▶ Stratal computation coupled with substance-free representations gives us substantial mileage with fairly standard OT devices
- ▶ Still, some of the lenition cases appear to lack clear morphosyntactic motivation — not for the first time

Trugarez!

Thank you!



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